

**What is claimed is**

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1 1. A color separation beam splitter for projectors comprising  
2 a plurality of prisms connected with each other and three  
3 optical interference filters having different wavelength  
4 ranges respectively formed on side surfaces of the plurality  
5 of prisms, wherein the color separation beam splitter is  
6 characterized in that the three optical interference filters  
7 include a yellow color reflective dichroic mirror which  
8 reflects pure yellow light and passes red light, blue light  
9 and green light; a red color reflective dichroic mirror which  
10 reflects pure red light and passes green light and blue light;  
11 and a blue color reflective dichroic mirror which reflects  
12 pure blue light and passes pure green light, so that when a  
13 white light is incident to the color separation beam splitter,  
14 a yellow light is first reflected by the yellow color  
15 reflective dichroic mirror, a red light is then reflected by  
16 the red color reflective dichroic mirror, and then a blue  
17 light and a green light are split by the blue color reflective  
18 dichroic mirror.

1 2. The color separation beam splitter as claimed in claim 1,  
2 wherein the plurality of prisms includes two triangular  
3 prisms having dichroic beam-splitting coatings formed on side  
4 surfaces corresponded to base angles of the triangular prisms;  
5 and four right-angled prisms having emerging surfaces which  
6 are perpendicular to lights emitted therefrom, in which a  
7 multi-layer thin film, which reflects yellow light, is formed  
8 on an incident surface of one of the right-angled prisms where  
9 an incident white light passes through.

1 3. The color separation beam splitter as claimed in claim 1  
2 wherein the plurality of prisms include three right-angled  
3 trapezoid prisms having optical interference thin films  
4 respectively formed on the surfaces corresponding to two  
5 right-angles of the right-angled trapezoid prisms; and two  
6 right-angled prisms having emerging surfaces which are  
7 perpendicular to lights emitted therefrom.

1 4. The color separation beam splitter as claimed in claim 1  
2 wherein the plurality of prisms include three right-angled  
3 trapezoid prisms having optical interference thin films  
4 respectively formed on the surfaces of the right-angled  
5 trapezoid prisms corresponding to two right-angles of the  
6 right-angled trapezoid prisms so that a red light can be  
7 reflected twice by the optical interference thin films; a  
8 multi-layer thin film reflecting yellow light formed on the  
9 incident surface of one of the right-angled trapezoid prisms  
10 where an incident white light is input; a triangular prism  
11 having an optical interference thin film formed on the surface  
12 corresponding to a base angle of the triangular prism so that  
13 a blue light is reflected twice by the optical interference  
14 thin film of the right-angled trapezoid prisms and the optical  
15 interference thin film of the triangular prism; and a  
16 right-angled, triangular prism for making a light  
17 perpendicular to an emerging surface thereof where the light  
18 is emitted from.

1 5. The color separation beam splitter as claimed in claim 1  
2 wherein the yellow color reflective dichroic mirror is a  
3 multi-layer film including periodic layers of  $\text{Al}_2\text{O}_3$  and  $\text{SiO}_2$ .

1 6. The color separation beam splitter as claimed in claim 1  
2 wherein both the red color reflective dichroic mirror and the  
3 blue color reflective dichroic mirror are multi-layer films  
4 including periodic layers of  $\text{TiO}_2$  and  $\text{SiO}_2$ .

1 7. The color separation beam splitter as claimed in claim 4  
2 wherein the red light, the blue light and the green light  
3 emitted from the prisms are transmitted along a direction  
4 parallel to the incident white light.

1 8. A projector comprising a color separation beam splitter  
2 of claim 4 for providing lights of three primary colors; three  
3 pieces of liquid crystal light valves having the lights of  
4 three primary colors passing therethrough, respectively;  
5 three dichroic mirrors for receiving the lights of three  
6 primary colors output from the liquid crystal light valves  
7 and then transmitting the lights of three primary colors along  
8 a same direction; an objective lens for receiving and  
9 projecting the lights of three primary colors.

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